Chapter Four
AIRPORT DEVELOPMENT ALTERNATIVES

Chapter Four

Airport Development Alternatives

Prior to defining the development program for Chino Airport, it is important to consider development potential and constraints at the airport. The purpose of this chapter is to consider the actual physical facilities that are needed to accommodate projected demand and meet the program requirements as defined in Chapter Three, Aviation Facility Requirements.

In this chapter, a series of airport development scenarios are considered for the airport. In each of these scenarios, different physical facility layouts are presented for the purposes of evaluation. The ultimate goal is to develop the underlying rationale that supports the final master plan recommendations. Through this process, an evaluation of the highest and best uses of airport property is made while considering local goals, physical constraints, and appropriate federal airport design standards, where appropriate.

Any development proposed by a master plan evolves from an analysis of projected needs. Though the needs were determined by the best methodology available, it cannot be assumed that future events will not change these needs. The master planning process attempts to develop a viable concept for meeting the needs caused by projected demands through the planning period.

The number of potential alternatives that can be considered can be endless. Therefore, some judgment must be applied to identify the alternatives that have the greatest potential for implementation. The alternatives presented in this chapter have been identified as such.

The alternatives presented in this chapter have been developed to meet the overall program objectives for the airport in a balanced manner. Through coordination with the planning advisory committee (PAC) and San Bernardino County, the alternatives (or combination thereof) will be refined and modified as necessary to develop the recommended development program. Therefore, the alternatives presented in this chapter can be considered a beginning point in the development of the recommended master plan development program and input will be necessary to define the resultant development program.

AIRPORT DEVELOPMENT OBJECTIVES

It is the overall objective of this effort to produce a balanced airside and landside complex to serve forecast aviation demands. However, before defining and evaluating specific alternatives, airport development objectives should be considered. As owner and operator, San Bernardino County provides the overall guidance for the operation and development of Chino Airport. It is of primary concern that the airport is marketed, developed, and operated for the betterment of the community and its users. With this in mind, the following development objectives have been defined for this planning effort:

1. Develop a safe, secure, and efficient aviation facility in accordance with applicable federal, state, and local regulations.
2. Identify facilities to efficiently serve the diverse mix of general aviation users of Chino Airport.
3. Identify the necessary improvements that will provide sufficient airside and landside capacity to accommodate the long term planning horizon level of demand for the area.
4. Target local economic development through the development of available property.
5. Maintain and operate the airport in compliance with applicable environmental regulations, standards, and guidelines.

The remainder of this chapter will describe various development alternatives for the airside and landside facilities. Within each of these components, specific facilities are required or desired. Although each component is treated separately, planning must integrate the individual requirements so that they complement one another.

ALTERNATIVE DEVELOPMENT CONSIDERATIONS

The issues to be considered in this alternatives analysis are summarized on **Exhibit 4A**. The issues are summarized by airfield and landside functional use categories. These issues are the result of the findings of the Aviation Demand Forecasts and

AIRFIELD CONSIDERATIONS

- Conform with Airport Reference Code (ARC) D-III design requirements along Runway 8R-26L.
    - Identify options for complying with Object Free Area (OFA) clearing standards.
- Conform with ARC C-III design requirements along Runway 8L-26R.
    - Identify options for complying with Runway Safety Area (RSA) grading and clearing standards.
    - Identify options for complying with OFA clearing standards.
- Identify the role and design requirement options for Runway 3-21
- Increase Runway 8L-26R length to 5,500 feet.
- Relocate Instrument Landing System (ILS) to Runway 26L, Upgrade to Category I
- Consider options for providing efficient taxiway access to each runway end.
- Provide for additional exit taxiways.
- Provide for holding aprons at each runway end.
- Provide for a perimeter service road.

LANDSIDE CONSIDERATIONS

- Identify potential locations for new hangar development to meet long term needs.
- Provide for a helipad and helicopter parking positions.
- Identify potential locations for the development of an aircraft wash rack and tenant maintenance shelter.
- Identify potential locations for a dedicated airport maintenance building.
- Identify potential locations for a consolidated fuel storage area.
- Provide for segregated vehicle and aircraft operational areas.
- Provide for efficient vehicular access to future development areas.

CHINO AIRPORT

Exhibit 4A
ALTERNATIVE DEVELOPMENT CONSIDERATIONS

Aviation Facility Requirements evaluations and include input from San Bernardino County and the PAC.

AIRFIELD ALTERNATIVES

Airfield facilities are, by nature, the focal point of the airport complex. Because of their primary role and the fact that they physically dominate airport land use, airfield facility needs are often the most critical factor in the determination of viable airport development alternatives. In particular, the runway system requires the greatest commitment of land area and often imparts the greatest influence of the identification and development of other airport facilities. Furthermore, aircraft operations dictate the Federal Aviation Administration (FAA) design criteria that must be considered when looking at airfield improvements. These criteria, depending upon the areas around the airport, can often have a significant impact on the viability of various alternatives designed to meet airfield needs.

SAFETY AREAS

The design of airfield facilities includes both the pavement areas to accommodate landing and ground operations of aircraft as well as imaginary safety areas to protect aircraft operational areas and keep them free of obstructions that could affect the safe operation of aircraft at the airport. The imaginary safety areas include the: runway safety area (RSA), object free area (OFA), obstacle free zone (OFZ), and runway protection zone (RPZ). **Table 4A** summarizes the dimensional standards for these safety areas.

Obstacle Free Zone

The OFZ is a "defined volume of airspace centered above the runway centerline whose elevation is the same as the nearest point on the runway centerline and extends 200 feet beyond each runway end." A graphical depiction of the OFZ for each runway is shown on **Exhibit 4B**. There are no obstructions to any OFZ at Chino Airport.

Runway Protection Zone

The RPZ is a trapezoidal area centered on the extended runway centerline to protect people and property on the ground. The RPZ is a two-dimensional area and has no associated approach surface. FAA standards require these areas to be under the control of the airport to ensure that these areas are kept clear of objects that could be hazardous to aircraft operations.

The airport does not control the entire RPZ for any runway end at the airport. Each of the RPZs extend beyond the existing airport property line.

It should be noted that, while preferable, the FAA does not require fee simple interest in the RPZ in all cases. The FAA does encourage an airport operator to have positive control over the RPZ to ensure that incompatible development and/or obstructions are not

TABLE 4A
Runway Design Standards

	RUNWAY 3-21			
	Existing C-II		Standard C-II	
Airport Reference Code	**3**	**21**	**3**	**21**
Approach Visibility Minimum	Visual		Visual	
Runway Width	150	150	100	100
Runway Safety Area (RSA)				
Width (centered on runway centerline)	400	400	400	400
Length Beyond Runway End	486	780	1,000	1,000
Runway Object Free Area (OFA)				
Width (centered on runway centerline)	800	800	800	800
Length Beyond Runway End	250	627	1,000	1,000
Runway Obstacle Free Zone (OFZ)				
Width (centered on runway centerline)	400	400	400	400
Length Beyond Runway End	200	200	200	200
Precision Object Free Area (POFA)				
Width (centered on runway centerline)	N/A	N/A	N/A	N/A
Length Beyond Runway End	N/A	N/A	N/A	N/A
Runway Centerline to:				
Parallel Taxiway Centerline	400	400	300	300
Runway Protection Zones (RPZ)				
Inner Width	500	500	500	500
Outer Width	1,010	1,010	1,010	1,010
Length	1,700	1,700	1,700	1,700
	RUNWAY 8L-26R			
	Existing C-II		Standard C-II	
Airport Reference Code	**8L**	**26R**	**8L**	**26R**
Approach Visibility Minimum	Visual	3/4 Mile	Visual	One Mile
Runway Width	150	150	100	100
Runway Safety Area (RSA)				
Width (centered on runway centerline)	400	400	400	400
Length Beyond Runway End	898	800	1,000	1,000
Runway Object Free Area (OFA)				
Width (centered on runway centerline)	800	800	800	800
Length Beyond Runway End	898	800	1,000	1,000

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0 1000 2000
SCALE IN FEET

NORTH

Merrill Avenue
Euclid Avenue
Stearman Place
Grove Avenue
Apron Area A
Apron Area B
Holding Apron
Departure RPZ
Approach RPZ
Holding Apron
Displaced Landing Threshold
Holding Apron
Runway 8L-26R
Runway 3-21 6,003' x 150'
Runway 8R-26L
Existing Localizer in Safety Area
Relocated Localizer
Existing Segmented Circle
Existing Glideslope
Natural Gas Valves (to be removed)
MALSR
Holding Apron
Relocated Segmented Circle
Relocated Glideslope
Holding Apron
Fire Suppression Storage Ponds (to be removed)
Apron Area F
Displaced Landing Threshold
Kimball Avenue
AIRPORT PROPERTY LINE
Approach RPZ
Departure RPZ

LEGEND

- Airport Property Line
- Object Free Area (OFA)
- OFA without Displaced Threshold
- Runway Safety Area (RSA)
- RSA without Displaced Threshold
- Obstacle Free Zone (OFZ)
- Building Restriction Line (BRL)
- Localizer Critical Area
- Precision Object Free Area
- Glideslope Critical Area
- Runway Visibility Zone
- Runway Protection Zone (RPZ)
- Ultimate Pavement
- Pavement to be Removed
- Ultimate Property Line
- Ultimate Avigation Easement
- **MALSR** — Medium intensity approach lighting system with runway alignment indicator lights
- A — Existing Taxiway Designation
- **A** — Future Taxiway Designation

CHINO AIRPORT

Exhibit 4B
AIRFIELD ALTERNATIVE A

TABLE 4A (Continued)
Runway Design Standards

	RUNWAY 8L-26R			
	Existing C-III		Standard C-III	
Airport Reference Code	**8L**	**26R**	**8L**	**26R**
Runway Obstacle Free Zone (OFA)				
Width (centered on runway centerline)	400	400	400	400
Length Beyond Runway End	200	200	200	200
Precision Object Free Area (POFA)				
Width (centered on runway centerline)	N/A	N/A	N/A	800
Length Beyond Runway End	N/A	N/A	N/A	200
Runway Centerline to:				
Parallel Taxiway Centerline	400	400	300	300
Runway Protection Zones (RPZ)				
Inner Width	500	1,000	500	500
Outer Width	1,010	1,750	1,010	1,010
Length	1,700	2,500	1,700	1,700
	RUNWAY 8R-26L			
	Existing D-III		Standard D-III	Standard D-III
Airport Reference Code	**8R**	**26L**	**8R**	**26L**
Approach Visibility Minimum	Visual		Visual	½ Mile
Runway Width	100	100	100	100
Runway Safety Area (RSA)				
Width (centered on runway centerline)	500	500	500	500
Length Beyond Runway End	1,000	1,000	1,000	1,000
Runway Object Free Area (OFA)				
Width (centered on runway centerline)	800	800	800	800
Length Beyond Runway End	1,000	1,000	1,000	1,000
Runway Obstacle Free Zone (OFZ)				
Width (centered on runway centerline)	400	400	400	400
Length Beyond Runway End	200	200	200	200
Precision Object Free Area (POFA)				
Width (centered on runway centerline)	N/A	N/A	N/A	N/A
Length Beyond Runway End	N/A	N/A	N/A	N/A
Runway Centerline to:				
Parallel Taxiway Centerline	400	400	400	400
Runway Protection Zones (RPZ)				
Inner Width	500	500	500	1,000
Outer Width	1,010	1,010	1,010	1,750
Length	1,700	1,700	1,700	2,500

developed within the RPZ area. In many cases, an avigation easement is acquired to define land use within the RPZ and provide positive control of the airspace within the RPZ. In situations where fee simple acquisitions and/or avigation easements are too costly or not practical to obtain, local land use controls and zoning can also be effective in controlling development within an RPZ to ensure that it is compatible with aircraft operations.

The size and location of the ultimate RPZ for each runway end is shown throughout this report. The exhibits within this report also show the areas to be acquired to protect each RPZ. A combination of fee simple acquisition of land and the acquisition of avigation easements is shown to protect the RPZs at Chino Airport.

Object Free Area

The FAA defines the OFA as "a two dimensional ground area surrounding runways, taxiways, and taxilanes which is clear of objects except for objects whose location is fixed by function (i.e. airfield lighting)." A graphical depiction of the OFA for each runway is shown on **Exhibit 4B**.

Two fire suppression tanks and associated security fencing are located within the Runway 8R-26L OFA. To fully comply with OFA standards, these fire suppression tanks may ultimately need to be relocated. Water and fire protection improvements in the area around the airport may ultimately provide sufficient water flows so that these tanks are not required to meet fire code and can be removed.

Runway 3-21 does not fully comply with OFA design standards. The OFA behind the Runway 3 and Runway 21 ends extend beyond the existing airport property line and are obstructed by Merrill Avenue, Kimball Avenue, and existing perimeter fencing. The same features obstruct the RSA for each runway end. Since the options for meeting OFA standards are the same as the options for meeting RSA standards, the discussion of the options available to meet OFA standards is provided in the following section detailing the options available to meet RSA standards.

Change 6 to FAA Advisory Circular (AC) 150/5300-13 established the precision OFA (POFA). The POFA is centered on the extended runway centerline and extends 200 feet beyond the runway end. The POFA extends 400 feet each side of the extended centerline. The POFA applies to all runways with instrument approach procedures that provide approach visibility minimums less than ¾-mile. At Chino Airport, the Runway 26R end must currently comply with POFA requirements as the existing instrument landing system (ILS) approach provides for landings when visibility minimums are as low as ¾-mile. Should the ILS be relocated to the Runway 26L end (as recommended in this master plan), the Runway 26L end would need to comply with POFA requirements. The limits of the POFA for the Runway 26R and Runway 26L ends are shown on **Exhibit 4B**. There are no obstructions to either POFA.

Runway Safety Area

The RSA is "a defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway." RSA standards require that this area be free from any objects that are not required for navigation and are not equipped with frangible bases. Additionally, the RSA must be free of any hazardous ruts, humps, and depressions. A graphical depiction of the limits of the RSA for each runway are shown on **Exhibit 4B**.

The airport presently does not comply with RSA requirements behind the Runway 26R, Runway 3, and Runway 21 ends. A series of natural gas valves are located within the RSA behind the Runway 26R end. Additionally, the RSA does not meet grade requirements. A ditch and the former Grove Avenue roadway extend through the Runway 21 RSA.

The RSA extends beyond the existing airport property line behind the Runway 3 and Runway 21 ends. For Runway 3, the RSA extends across Kimball Avenue and is obstructed by perimeter fencing. At the Runway 21 end, the RSA extends across Merrill Avenue and is obstructed by perimeter fencing. A ditch and the former Grove Avenue roadway extends through the Runway 26R RSA.

FAA Order 5300.1F, *Modification of Agency Airport Design, Construction, and Equipment Standards* states runway safety areas that do not meet dimensional standards are subject to review following the requirements of FAA Order 5200.8, *Runway Safety Area Program*. Modifications of standards are ***not*** issued for nonstandard runway safety areas.

FAA Order 5200.8 establishes the procedures that the FAA will follow in implementing the Runway Safety Area Program. The objective of the Runway Safety Area Program is that all RSAs at federally-obligated airports conform to the dimensional standards to the extent practicable.

The order requires that each Regional Airports Division Manager review each RSA and make one of the following determinations:

(1) The existing RSA meets the current standards.

(2) The existing RSA does not meet the current standards, but it is practicable to improve the RSA so that it will meet current standards.

(3) The existing RSA can be improved to enhance safety, but the RSA will still not meet current standards.

(4) The existing RSA does not meet current standards, and it is not practicable to improve the RSA.

Appendix 2 of FAA Order 5200.8 provides the direction for an RSA determination. This includes the alternatives that must be evaluated. The following discussion will review each of the required alternatives.

Paragraph 3 of Appendix 2 states: "The first alternative that must be considered in every case is constructing the traditional graded runway safety area surrounding the runway. Where it is not practicable to obtain the entire safety area in this manner, as much as possible should be obtained. Then, the following alternatives shall be addressed in the supporting documentation . . .

a. Relocation, shifting, or realignment of the runway.

b. Reduction in runway length where the existing runway length exceeds that which is required for the existing or projected design aircraft.

c. A combination of runway relocation, shifting, grading realignment, or reduction.

d. Declared distances.

e. Engineered Materials Arresting Systems (EMAS)."

The deficiencies of the Runway 26R, Runway 3, and Runway 21 RSAs and OFAs were described previously. From the list of alternatives above, several basic options can be considered at Chino Airport. The first and most straightforward alternative is to fully meet the design standards by providing for the clearing and proper fill and grading of the safety area and object free area off the runway ends. This is certainly the most desirable as long as physical, environmental, and economic considerations can be accommodated.

This first option is most applicable to the RSA behind the Runway 26R end. In this area, the natural gas valves can be relocated below grade and the ditch and former Grove Avenue roadway filled and graded to RSA standards.

Fully conforming with RSA and OFA standards behind the existing Runway 3 and Runway 21 ends could be more difficult. Since the RSA extends beyond the existing airport property line, additional land acquisition would be necessary to provide for the RSA and OFA. Additionally, Merrill Avenue and Kimball Avenue would need to be relocated to meet RSA and OFA standards behind the Runway 3 and Runway 21 ends.

For Runway 21, Merrill Avenue would need to be relocated approximately 260 feet northeast and approximately one acre of land acquired to provide for the full RSA and OFA. For Runway 3, Kimball Avenue would need to relocated approximately 485 feet southwest and approximately one acre of land acquired to provide for the full RSA and OFA. Additional land acquisition would be necessary to provide for the realigned Merrill Avenue and Kimball Avenue right-of-way.

Besides the costs to relocate these roadways and acquire the necessary land to protect the RSA and OFA, existing land use planning would be impacted. Existing farms and residential homes would be impacted and potentially need to be relocated to provide for the roadway relocations. Additionally, the City of Ontario and City of Chino have established specific

land use plans for areas beyond the Runway 3 and Runway 21 ends based upon Merrill Avenue and Kimball Avenue remaining in their existing alignment. A revision of their land use plans would be a prerequisite to realigning these roadways.

The next option is to shift, or realign, the runway. Shifting Runway 3-21 to the northeast or southwest cannot be considered an option since both ends of Runway 3-21 do not meet RSA or OFA standards. A realignment of Runway 3-21 is not a practical option either. As shown in Chapter Three, Aviation Facility Requirements, Runway 3-21 is ideally aligned with the seasonal winds from the northeast. A realignment of the runway would degrade its ability to effectively provide wind coverage during periods when winds are from the northeast or southwest.

A third option would be to displace or relocate the Runway 3 and Runway 21 thresholds to effectively locate the RSA and OFA on airport property. These options will reduce the effective length of the runway. The portion of pavement behind a relocated threshold is not available for takeoff or landing. The portion of pavement behind a displaced threshold is not available for landing, however, it may be available for takeoff roll. These options avoid the costs of relocating Merrill Avenue or Kimball Avenue and acquiring the property necessary to provide for the full RSA and OFA.

Exhibit 4B depicts the alternative of displacing the Runway 3 and Runway 21 landing thresholds to meet RSA and OFA requirements. Displacing the landing thresholds involves the use of a concept known as declared distances. Declared distances ensure that the full OFA and RSA are provided during critical aircraft operational activities by notifying pilots of the length of runway available for landing or departure. Specifically, declared distances incorporate the following concepts:

Takeoff Runway Available (TORA) - The runway length declared available and suitable for the ground run of an airplane taking off;

Takeoff Distance Available (TODA) - The TORA plus the length of any remaining runway and/or clearway beyond the far end of the TORA;

Accelerate-Stop Distance Available (ASDA) - The runway plus stopway length declared available for the acceleration and deceleration of an aircraft aborting a takeoff; and

Landing Distance Available (LDA) - The runway length declared available and suitable for landing.

Table 4B summarizes declared distances for Chino Airport. As shown in the table, the TORA and TODA are 6,003 feet and equal to the actual pavement available since a clearway has not been designated for the airport. When determining the ASDA, FAA guidelines require that the full RSA and OFA safety areas be provided at the far end of the runway an aircraft is departing. For example, the ASDA for Runway 3 is reduced by 353 feet, the distance necessary to locate the RSA and OFA on the available airport property behind the Runway 21 end.

For Runway 21, the ASDA is reduced by 750 feet, the distance necessary to locate the RSA and OFA on the available airport property behind the Runway 3 end.

TABLE 4B
Runway 3-21 Declared Distances

	Runway 3	Runway 21
TORA/TODA	6,003	6,003
ASDA	5,650	5,253
LDA	4,900	4,900

The LDA must provide the full RSA and OFA at the approach end of the runway, as well as at the rollout end of the runway. The LDA is reduced by 1,126 feet, the length necessary to meet OFA and RSA standards behind each runway end.

The use of declared distances requires specific approval from the FAA Western-Pacific region. While FAA AC 150/5300-13, *Airport Design*, and FAA Order 5200.8 specify the use of declared distances for complying with RSA design standard deficiencies, the FAA Western-Pacific region has limited the implementation of declared distances at general aviation airports. This is related to concerns that pilots may not understand the limitations of declared distances or disregard the limitations on landing and departure distances.

When displacing a landing threshold, FAA guidelines specify two runway protection zones (RPZs) - an approach RPZ and departure RPZ. Normally, the approach and departure RPZ overlap. **Exhibit 4B** depicts the approach RPZ and departure RPZ for each runway end. These RPZs extend beyond the existing airport boundary. The acquisition of approximately 6.9 acres of land is shown to protect the Runway 3 RPZs. The acquisition of approximately 16.6 acres of land is shown to protect the Runway 21 RPZs.

Exhibit 4C depicts the option of relocating the Runway 3 and Runway 21 thresholds to meet RSA standards. In contrast to implementing declared distances, the pavement behind the new runway thresholds would not be available for use and most likely removed. This would reduce both the landing and departure distances at the airport. As shown on the exhibit, relocating the Runway 3 and Runway 21 thresholds to meet RSA and OFA standards would reduce the overall Runway 3-21 length to 4,900 feet.

The acquisition of approximately 2.0 acres of land is shown to protect the Runway 3 RPZ. The acquisition of approximately 8.1 acres of land is shown to protect the Runway 21 RPZ. In addition to abandoning a portion of the runway pavement, this alternative would also abandon a portion of Taxiway C. As detailed in Chapter One, Taxiway C from the Runway 21 end to Taxiway B was reconstructed in 2002.

Displacing the landing thresholds or relocating the landing thresholds would have similar impacts on existing navigational aids. The existing visual approach slope indicator (VASI) at each runway end would need to be relocated. The Runway 21 runway end identifier lights (REILs) would need to be relocated as well.

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0 1000 2000
SCALE IN FEET

NORTH

Merrill Avenue
Euclid Avenue
Stearman Place
Grove Avenue
Apron Area A
Apron Area B
Holding Apron
Relocated Landing Threshold
Holding Apron
Relocated ASOS
Natural Gas Valves (to be removed)
ASOS
Runway 3-21 4,900' x 150'
Runway 8L-26R
Existing Localizer in Safety Area
Existing Segmented Circle
Relocated Glideslope
Existing Glideslope
642'
MALSR
Runway 8R-26L
Relocated Localizer
Holding Apron
Fire Suppression Storage Ponds (to be removed)
Apron Area F
Relocated Landing Threshold
Kimball Avenue
AIRPORT PROPERTY LINE

LEGEND

- Airport Property Line
- Object Free Area (OFA)
- OFA without Displaced Threshold
- Runway Safety Area (RSA)
- RSA without Displaced Threshold
- Obstacle Free Zone (OFZ)
- Building Restriction Line (BRL)
- Localizer Critical Area
- Precision Object Free Area
- Glideslope Critical Area
- Runway Visibility Zone
- Runway Protection Zone (RPZ)
- Ultimate Pavement
- Pavement to be Removed
- Ultimate Property Line
- Ultimate Avigation Easement
- **MALSR** Medium intensity approach lighting system with runway alignment indicator lights
- **ASOS** Automated Surface Observation System
- A Existing Taxiway Designation
- A Future Taxiway Designation

CHINO AIRPORT

Exhibit 4C
AIRFIELD ALTERNATIVE B

Displacing the landing thresholds maintains the existing runway length for departure while reducing only the landing length. Relocating the runway ends reduces both the landing and departure distances. The reduction in landing distance and departure distance may affect some aircraft operations. Specifically, some larger aircraft, which now operate on Runway 3-21, may not be able to operate on the runway after implementing either of these alternatives. At 6,003 feet, this runway exceeds the minimum runway length of 5,500 feet recommended by the FAA to serve typical general aviation aircraft to 60,000 pounds.

As detailed previously in Chapter Three, based upon wind coverage requirements, Runway 3-21 is needed only for small general aviation aircraft during seasonal wind conditions. Sufficient wind coverage is provided by the parallel runways to meet large aircraft departure and landing requirements. With a suitable alternative available to meet departure requirements for large general aviation aircraft, the impacts of a reduction in the landing and/or departure distance along Runway 3-21 would be minimal. Both alternatives provide a landing length of 4,900 feet. This is greater than the 4,500 feet recommended by the FAA to serve small general aviation aircraft under 12,500 pounds. This includes most single and multi-engine piston aircraft and many models of turboprop and business jets.

A final option would be to determine how much safety area can be provided without significantly affecting the operations of the users of the airport. This is obviously less desirable to the FAA and would be an acceptable determination only if the previous options are proven infeasible, and it is proven that the alternative would not unnecessarily endanger lives or property. FAA Order 5200.8 states: ". . . Any portion of land that will increase the RSA, even if it is but an incremental increase, and will not result in meeting the standard fully, is preferable and will serve as a starting point for the consideration of additional alternatives . . . Incremental gains must be obtained whenever possible. The gain may be relatively little, but any gain is valuable."

The OFA between the existing Runway 3 end and the airport property line encompasses approximately 598,360 square feet, or 75 percent of the area of a full design OFA (which encompasses 800,000 square feet). The OFA between the existing Runway 21 end and the airport property line encompasses approximately 759,890 square feet, or 95 percent of the area of a full design OFA.

The RSA between the existing Runway 3 end and the airport property line encompasses approximately 384,370 square feet, or 64 percent of the area of a full design RSA (which encompasses 600,000 square feet). The RSA between the existing Runway 21 end and the airport property line encompasses approximately 491,590 square feet, or 82 percent of the area of a full design RSA.

The location of Merrill Avenue to the north and Kimball Avenue to the south prevent any appreciable gain in the

area of the OFA or RSA. Therefore, the maximum potential of the OFA and RSA are currently realized at the airport. The location of a perimeter service road could limit the OFA and RSA further. A perimeter service road would require a 30-foot right-of-way and a 20-foot wide paved surface.

FAA Order 5200.8 further states: "At any time, when it is not practicable to obtain a safety area that meets the current standards, consideration should be given to enhancing the safety of the area beyond the runway end with the installation of EMAS. The AC 150/5220-22, Change 1, *Engineered Materials Arresting Systems (EMAS) for Aircraft Overruns*, pertaining to the installation and use of EMAS, provides details on design to be considered in determining feasibility of this alternative."

Recognizing the difficulties associated with achieving a standard safety area at all airports, the FAA undertook research programs on the use of various materials for arresting systems. Engineered Materials Arresting Systems (EMAS) are comprised of high energy absorbing materials of selected strength which will reliably and predictably crush under the weight of an aircraft. According to the AC, EMAS is not to be considered a substitute for, nor equivalent to, any length or width of safety area, and does not affect declared distance calculations.

The EMAS system is designed to stop an overrunning aircraft by exerting predictable deceleration forces on its landing gear as the EMAS material crushes. It must be designed to minimize the potential for structural damage to aircraft, since such damage could result in injuries to passengers and/or affect the predictability of deceleration forces.

An EMAS is located beyond the end of the runway, centered on the extended runway centerline. It typically is designed to begin at some distance beyond the runway end to avoid damage due to jet blast and short landings. The minimum width of the EMAS shall be the width of the runway, plus any sloped area as necessary. The system should be designed to decelerate jet aircraft expected to use the runway at exit speeds of 70 knots or less without imposing loads that exceed the aircraft's structural design limits.

For planning purposes, an EMAS to serve Chino Airport and its critical aircraft would need to begin a minimum of 100 feet beyond the runway end, and extend to 400 feet beyond the runway end. The cost for the installation of EMAS is estimated at approximately $4.0 million per runway end. EMAS is generally limited to the width of the runway because of its cost, therefore, its effectiveness is limited to aircraft running directly off the end of the runway. There is also a cost to replace any part of the system damaged during an overrun incident.

In effect, EMAS is limited to providing an additional safety enhancement directly off the end of the runway. In the case of Runway 3-21, this enhancement is even more limited due to the fact that the airport presently meets 82 percent of the RSA behind the Runway 21 end and 94 percent of the

RSA behind the Runway 3 end. In addition, most aircraft operating at the airport have limited seating compared to that of commercial jet aircraft. Less expensive aircraft and significantly fewer persons on board general aviation aircraft reduces the value of adding EMAS into the available safety area.

Safety Area Conclusions

A review and determination of a preferred alternative for meeting OFA and RSA standards at the Runway 3 and Runway 21 ends will require a determination from the FAA. The FAA could reach several conclusions. First, the FAA could determine that the OFA and RSA meet standards to the extent practicable and allow for them to remain in their existing condition. Secondly, the FAA could approve displacing the landing thresholds and implementing declared distances to meet standards. Finally, the FAA could approve relocating the runway ends and abandoning the runway and taxiway pavement behind the relocated runway ends. The analysis presented above, independent research by the FAA, and input from San Bernardino County and the planning advisory committee (PAC), will be used as the basis for the final determination.

RUNWAY 8L-26R LENGTH

The Aviation Facility Requirements (presented in Chapter Three) indicated that Runway 8L-26R should be extended to 5,500 feet and the pavement strength increased from 12,000 pounds single wheel loading (SWL) to 30,000 pounds SWL and 60,000 pounds dual wheel loading (DWL). This would allow for this runway to be used by a greater number of business turboprop and turbojet aircraft for departures. The existing length is not sufficient for many business jets during the warm summer months. This can enhance airfield capacity by allowing for more simultaneous operations by the largest general aviation aircraft that use the airport.

Through a review of airfield alternatives, it was determined that extending Runway 8L-26R to the west would not be feasible. Such an extension would require a relocation of Euclid Avenue to meet RSA and OFA standards. The greatest impact would be the financial implications of such an extension in terms of new land purchases and rebuilding the road. Given that open land exists to the east of the airport for development, this alternative has little potential for implementation.

The remaining extension alternative, a 662-foot extension to east, was determined to be the most cost-effective and viable alternative for an extension to Runway 8L-26R and is shown on **Exhibit 4C**. This extension requires the relocation of the FAA-owned glideslope antenna for the ILS 26R instrument approach and precision approach path indicator (PAPI). Additionally, the existing automated surface observation system (ASOS) would be located in the extended RSA. The ASOS is shown for relocation north of its present position as depicted on **Exhibit 4C**.

TAXIWAYS

One of the primary considerations for taxiway development at Chino Airport is providing quick and efficient access to each runway end from the existing apron areas and future development areas. A consideration for landing aircraft is providing a sufficient number of exit taxiways so that aircraft can exit the runway as quickly as possible after landing. This increases airfield capacity and safety by reducing the amount of time that an aircraft occupies the runway. Consideration should also be given to reducing the number of runway crossings for taxiing aircraft. Finally, adequate holding aprons should be considered for each runway end. Holding aprons provide an area for aircraft to prepare for departure off the taxiway, allowing aircraft ready for departure to by-pass those aircraft preparing for departure.

Each alternative incorporates a new taxiway identification plan. The new identification plan anticipates the need to identify future taxiways. The new identification plan retains the existing Taxiway C and D designations. Taxiway N is changed to Taxiway A and Taxiway L is changed to Taxiway B. Taxiway K is changed to Taxiway E. Taxiway G is changed to Taxiway H. Taxiway B is changed to Taxiway D3. Taxiways J and F are changed to Taxiways C1 and C2. The discussion of taxiway alternatives will refer to these new taxiway designations for clarity.

Presently, each runway is served by a full-length parallel taxiway. Taxiway D is located on the north side of Runway 8L-26R. Taxiway N (future Taxiway A) is located on the south side of Runway 8R-26L. Taxiway C is located northwest of Runway 3-21. Access to the Runway 26L end is also provided by Taxiway L (future Taxiway B). Taxiway G (future Taxiway H) provides access to the Runway 26R end.

The midfield intersection of Taxiway B (future Taxiway D3), Taxiway C, and Taxiway L (future Taxiway B) needs special consideration. This is a complicated intersection involving three taxiways. Simplification of this taxiway through the elimination of one or more of the intersecting taxiways should be considered.

Exhibit 4B depicts a taxiway system alternative for Chino Airport derived from previous planning efforts. This alternative includes the extension of Taxiway M to the Runway 3 and 21 ends, extension of Taxiway A (future Taxiway F) to Taxiway N (future Taxiway A), and extension of Taxiway L (future Taxiway B) to Taxiway A (future F). This alternative eliminates the portion of Taxiway B (future Taxiway D3) south of Runway 8L-26R. This reduces the number of taxiway intersections at this point on the airfield.

This alternative meets several objectives: first for Runway 3-21, it provides direct access to the Runway 3 and 21 ends from the future development areas in the southeast and northeast portions of the airport without the need to cross Runway 3-21. Access to the Runway 3 and Runway 21 ends from these portions of the airport is a long term need since these areas are mostly undeveloped. The advantage

of providing access to each runway end can be demonstrated by considering the taxi path of an aircraft from one of the areas.

The area southeast of Runway 3-21 is best described as the area south of Taxiway N (future Taxiway A) and east of Runway 3-21. To taxi to the Runway 3 end without an extended Taxiway M, an aircraft would taxi to Taxiway C via Taxiway N (future Taxiway A). While an aircraft would be able to access the Runway 3 end in this scenario, the aircraft would be required to hold before crossing Runway 3-21. This increases taxi time and aircraft traffic ground control. The same scenario applies to the Runway 21 end. For aircraft accessing the Runway 21 end from the northeast or southeast portions of the airfield, aircraft must cross Runway 3-21 at Taxiway G (future Taxiway H). Extending Taxiway M to the Runway 21 end would eliminate the need to cross Runway 3-21.

Extending Taxiway A (future Taxiway F) to Taxiway N (future Taxiway A) provides a couple of advantages. First, this provides an additional exit taxiway for both Runway 8R-26L and Runway 8L-26R. Secondly, it provides direct access to Apron Area A from Runway 8R-26L. Presently, there is no direct access to Apron Area A for aircraft landing Runway 26L. If the aircraft can slow before the Runway 3-21/Runway 8R-26L intersection, landing aircraft can exit Taxiway C and reach the northwest terminal area via Taxiway B (future Taxiway D3). This option would be eliminated with this taxiway alternative as Taxiway B (future Taxiway D3) is closed south of Runway 8L-26R.

Used in conjunction with an extended Taxiway A (future Taxiway F), an extended Taxiway L (future Taxiway B) can improve access to the Runway 26L end. The most direct taxi route to the Runway 26L end from Apron Area A or Apron Area B is via Taxiway D to Taxiway G (future Taxiway H), to Taxiway L (future Taxiway B). This requires crossing Runway 8L-26R at the Runway 26R end and Runway 3-21. This presently focuses all west-bound departures on Taxiway D and Taxiway G (future Taxiway H). Taxiway L (future Taxiway B) could provide relief for the Taxiway D and Taxiway G (future Taxiway H) intersection as aircraft bound for the Runway 26L end could cross Runway 8R-26L at Taxiway A (future Taxiway F) and access the Runway 26L end via Taxiway L (future Taxiway B).

Holding aprons are added at each runway end. To implement this alternative, the existing ILS glideslope antenna, segmented circle, and lighted wind cone would need to be relocated.

A second taxiway alternative is presented on **Exhibit 4C**. In contrast with the alternative presented on **Exhibit 4B**, this alternative provides access to the Runway 3 end with the development of a partial parallel taxiway extending from Taxiway N (future Taxiway A) to the Runway 3 end. Access to the Runway 21 end is provided by the development of a partial parallel taxiway extending from Taxiway G (future Taxiway H) to the Runway 21 end.

Used in conjunction, Taxiway G (future Taxiway H) and Taxiway N (future Taxiway A) provide an alternative to a full-length parallel taxiway southeast of Runway 3-21. For example, an aircraft taxiing between the Runway 3 and Runway 21 ends could taxi via Taxiway N (future Taxiway A) to Taxiway G (future Taxiway H) to the partial parallel taxiway extending to the Runway 21 end. This provides the same advantages of the prior alternative by allowing access to the Runway 3 and Runway 21 ends from the southeast and northeast portions of the airport without needing to cross Runway 3-21.

In this alternative, the portion of Taxiway C between Runway 8L-26R and Taxiway N (future Taxiway A) is removed to allow for the extension of Taxiway B (future Taxiway D3) to Runway 8R-26L. An extended Taxiway B (future Taxiway D3) would allow for an additional exit along Runway 8R-26L and provide a direct connection to Apron Areas A and B. Taxiways C and L (future Taxiway B) would be eliminated to simplify the intersection.

This alternative extends Taxiway A (future Taxiway F) to the relocated Runway 3 end. This would provide an additional exit taxiway for Runway 8R-26L and provide a direct connection to Apron Area A to Runway 3. This taxiway would also provide a second taxi route to Runway 26L from Apron Area A via Taxiway N (future Taxiway A). However, this taxi route would require crossing both Runway 8L-26R and Runway 8R-26L to reach the Runway 26L end.

This alternative adds an additional exit taxiway midway between the Runway 26L end and Taxiway G (future Taxiway H). Holding aprons are added at the Runway 3, Runway 21, Runway 8L, and Runway 8R ends. In contrast with the prior alternative, this alternative does not require the relocation of the segmented circle and lighted wind cone or ILS glideslope antenna.

INSTRUMENT LANDING SYSTEM

The Aviation Facility Requirements indicated that consideration should be given to relocating the ILS equipment from Runway 26R to Runway 26L. Runway 8R-26L provides the longest length at the airport and is expected to serve the full range of general aviation aircraft to operate at Chino Airport. Typically, the ILS is situated along the primary and longest runway to ensure that all aircraft expected to operate at the airport can take advantage of the low cloud ceiling and visibility minimums afforded by the ILS equipment. With the ILS now situated along Runway 26R, aircraft which may not be able to land Runway 26R (due to its shorter runway length) must follow the established circling minimums for the ILS approach. For aircraft with higher approach speeds, the visibility minimums increase by as much as 1 ¼ miles. Cloud ceiling minimums increase by 400 feet for all aircraft. This reduces the effectiveness of the ILS approach and reliability of the airport to operators, which may be prevented from using the airport during low visibility and cloud ceiling situations.

The ILS equipment is owned and operated by the FAA. Therefore, FAA approval would be required to relocate the ILS to Runway 26L.

The Aviation Facility Requirements noted that the installation of a medium intensity approach lighting system with runway alignment indicator lights (MALSR) would be needed to allow for Category I approach minimums (½-mile visibility and 200-foot cloud ceiling minimums). As shown in **Exhibit 4B** and **Exhibit 4C**, the MALSR begins 200 feet from the Runway 26L thresholds and extends for 2,500 feet. Any future MALSR to Runway 26L would extend beyond the existing airport boundary and require the fee simple acquisition of land to provide for the extension of the light bars.

A consideration with the relocation of the ILS to the Runway 26L end is the placement of the glideslope antenna. The glideslope antenna is used to establish and maintain the aircraft descent rate until visual contact confirms the runway alignment and location. Since the glideslope uses the ground in front of the antenna to develop the signal, this area needs to be graded and free of obstructions. This area, commonly referred to as the glideslope critical area (shown with a blue/white dashed line), typically extends for 200 feet either side of the glideslope antenna, 1,800 feet in front of the antenna, and 400 feet behind the antenna. The glideslope antenna can be located on either side of the runway and is best placed between 200 and 600 feet from the runway centerline, outside the RSA.

Exhibit 4B depicts the location of the glideslope antenna south of Runway 26L. As shown on the exhibit, the glideslope critical area would extend over Taxiway N (future Taxiway A) and encompass the existing fire suppression ponds. **Exhibit 4C** depicts the location of the glideslope antenna north of Runway 26L. In this location, the glideslope antenna would extend across Taxiway L (future Taxiway B). Taxiing aircraft can interfere with the glideslope signal. Therefore, with both alternatives, special hold lines would need to be established at the limits of the glideslope critical area to prevent aircraft from taxiing into the glideslope critical area. This would increase ground control for aircraft taxiing to and from Runway 26L. A consideration with placing the glideslope antenna south of Runway 26L is that the glideslope critical area would extend past the taxiway for Apron Area F. During periods when the ILS was in use, aircraft would not be able to enter or exit this apron area.

PERIMETER SERVICE ROAD

A perimeter service road provides access around the runway/taxiway system for airport administration vehicles, airport maintenance vehicles, airport rescue and firefighting vehicles, and other restricted users, such as aircraft refueling vehicles which must access remote fuel storage facilities. The perimeter service road is a restricted access road and is not open for public use. A perimeter service road eliminates the need for these vehicles to use the runway/taxiway for access.

This reduces air traffic ground control and reduces the potential for runway incursions.

Two alternative alignments for a future paved perimeter service road have been developed. **Exhibit 4B** depicts a perimeter service road beginning at Apron Area B and extending along the north and east airport boundary. At Apron Area F, the perimeter service road would extend along Taxiway N (future Taxiway A) and Taxiway M (outside the taxiway OFA) where it would again extend along the southern and western airport boundary to Stearman Place (A Street). This alignment would allow for east monitoring of the airport security fencing, while also allowing for vehicles to circumnavigate the runway/taxiway system.

Exhibit 4C provides an alternative alignment where the perimeter service road would be located entirely within the aircraft operations area (AOA). In this alignment, the perimeter service road would lie inside the building restriction line (BRL) outside the limits of the runway or taxiway OFA. This roadway extends entirely around the airfield system, extending from Taxiway B (future Taxiway D3) to Taxiway F (future Taxiway C2). An advantage of this alignment is that it would be located inside any landside development areas, in the secure AOA. The prior alternative would locate portions of the roadway along the airport boundary, which would eventually be located outside the secure AOA as landside facilities are developed between the roadway and airfield facilities.

RUNWAY 3-21

The Runway 3-21 RSA and OFA analysis presented above assumed Runway 3-21 continuing in its present role of serving large aircraft within Airport Reference Code (ARC) C-II. As detailed in the Aviation Facility Requirements (Chapter Three), Runway 3-21 mostly benefits small aircraft (aircraft less than 12,500 pounds) during those times when winds are from the northeast and crosswind components are greater than 10.5 knots on the parallel runway system. The parallel runway system provides sufficient wind coverage for large aircraft when the wind is from the northeast. Considering the limitations in fully meeting RSA and OFA standards on Runway 3-21 and the potential to significantly reduce the departure and landing lengths along Runway 3-21 (which would limit large aircraft operations) to meet these standards, consideration has been given to ultimately redeveloping Runway 3-21 to a lessor design standard (ARC B-I). ARC B-I is more closely aligned with the aircraft that need to use this runway. The Aviation Facility Requirements indicated that an ARC B-I runway would be 2,800 feet long and 60 feet wide.

Exhibit 4D depicts three alternatives for redeveloping Runway 3-21 to ARC B-I standards. Alternative A retains the southeast portion of Runway 3-21. In this alternative, the ARC B-I runway would extend from the existing Runway 3 end to an extended Taxiway L (future Taxiway B) that would provide access to the Runway 21 end. The remainder of the runway would be abandoned. The

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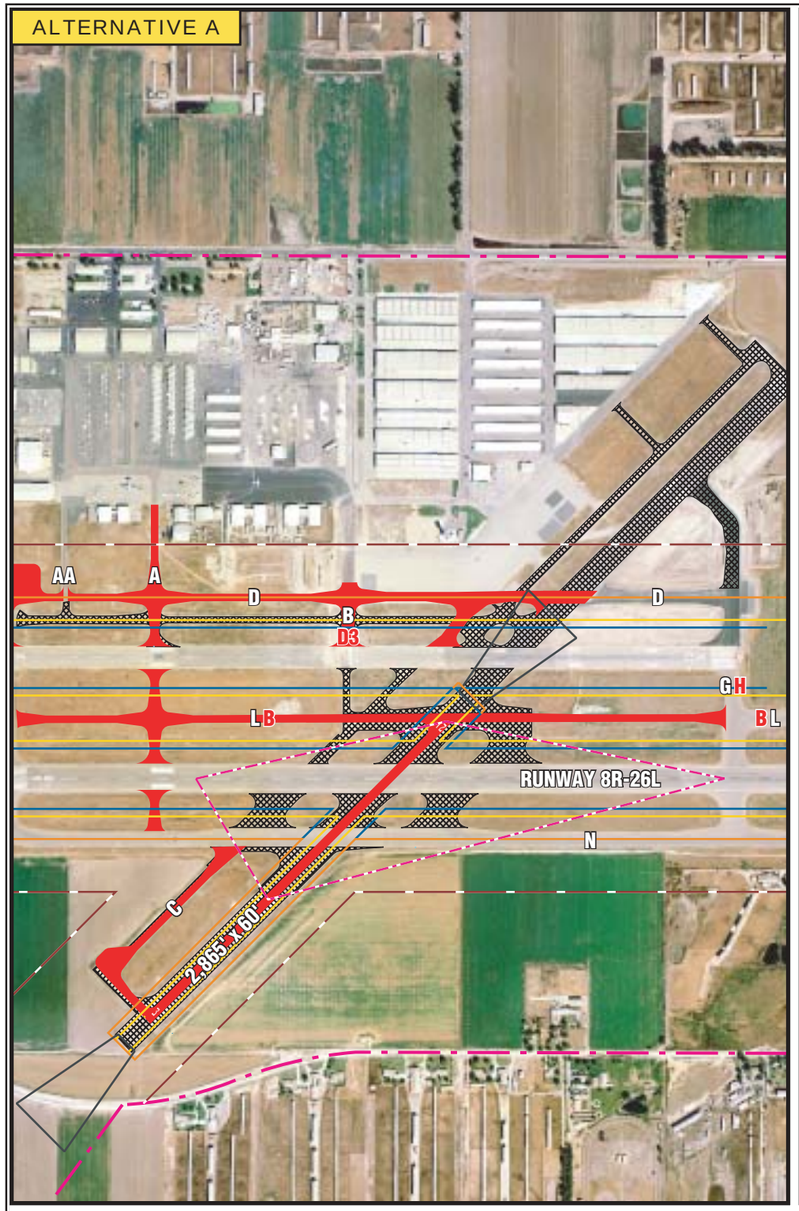
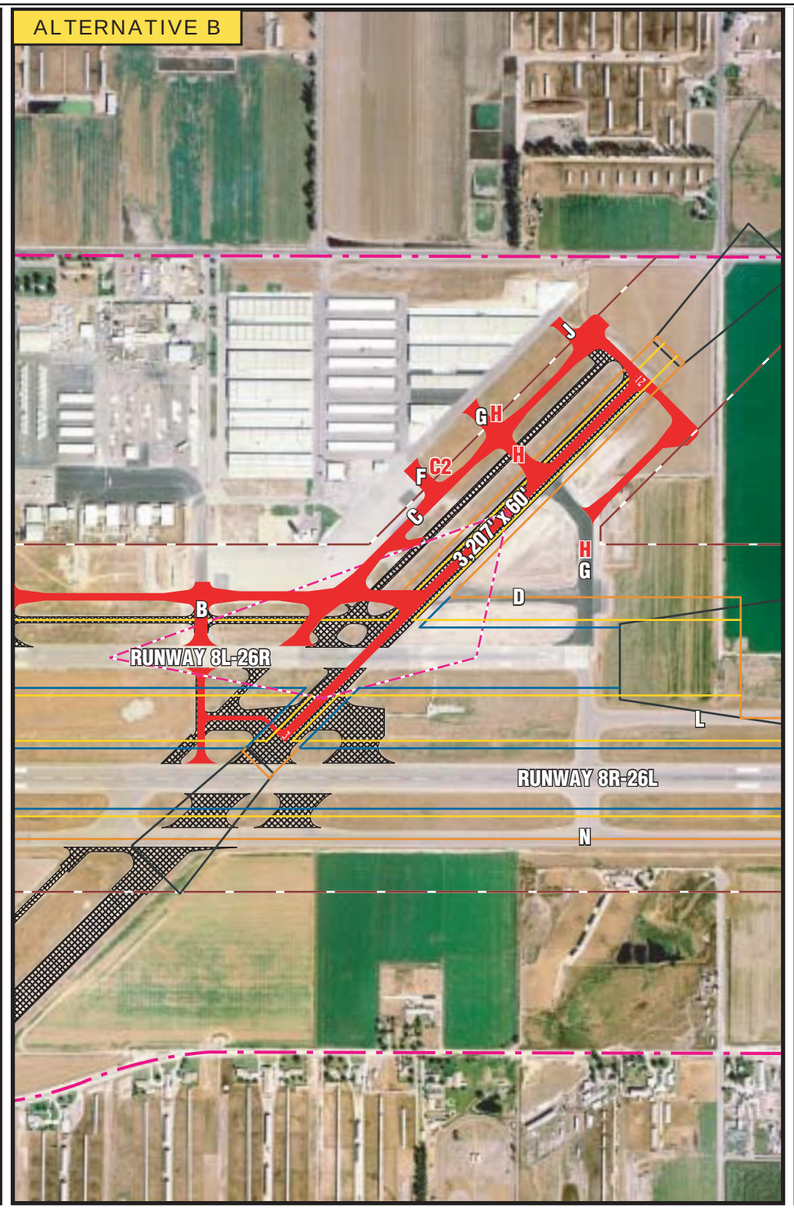
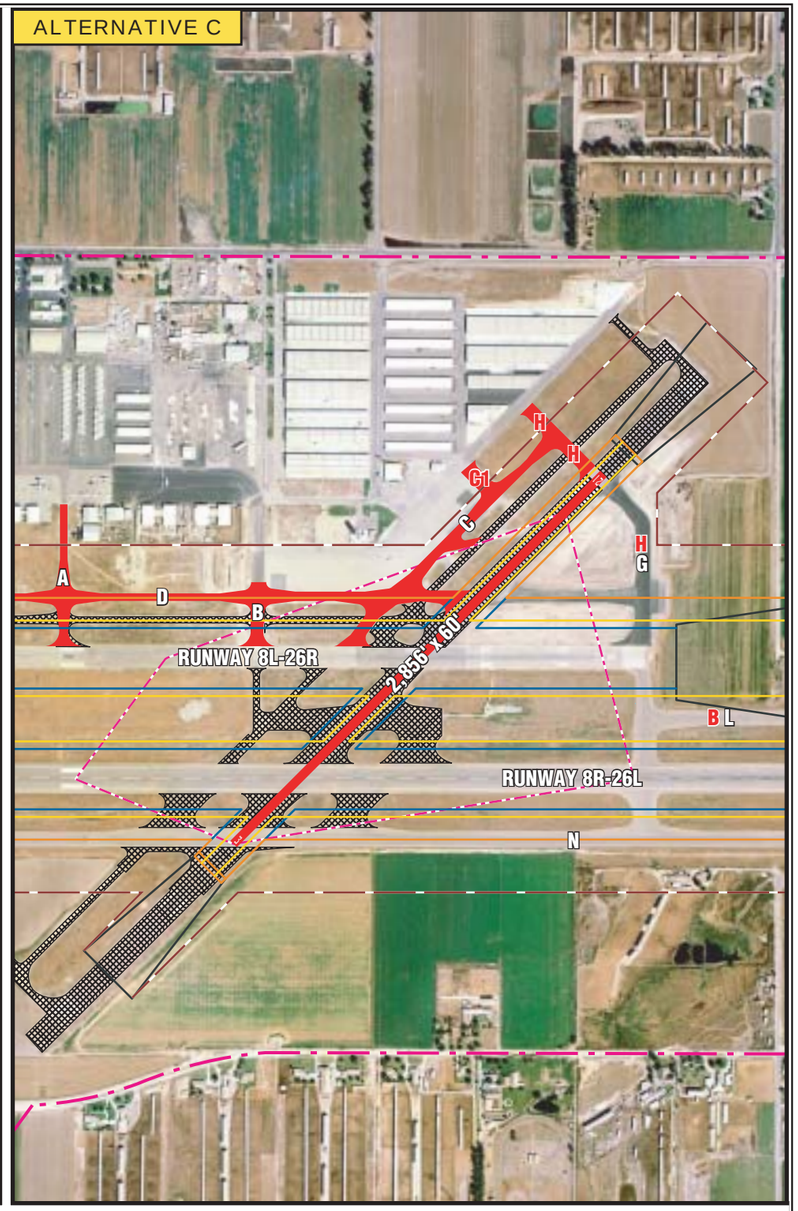
ALTERNATIVE A



ALTERNATIVE B



ALTERNATIVE C



LEGEND

- Airport Property Line
- Object Free Area (OFA)
- Runway Safety Area (RSA)
- Obstacle Free Zone (OFZ)
- Building Restriction Line (BRL)
- Runway Visibility Zone
- Runway Protection Zone (RPZ)
- Ultimate Pavement
- Pavement to be Removed
- A — Existing Taxiway Designation
- A — Future Taxiway Designation

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CHINO AIRPORT

Exhibit 4D
RUNWAY 3-21 ARC B-I ALTERNATIVES

area north of Taxiway D would be redeveloped for aviation-related development.

Alternative B retains the northeast portion of Runway 3-21 for the development of an ARC B-I runway. In this alternative, the redeveloped runway would extend from the existing Runway 21 end to approximately Taxiway L (future Taxiway B). Similar to Alternative A, the remainder of the runway would be abandoned. The area south of Taxiway N (future Taxiway A) would be redeveloped for aviation-related development.

Alternative C locates a 2,856-foot ARC B-I runway between Taxiway N (future Taxiway A) and Taxiway G (future Taxiway H). In contrast with Alternatives A and B, this runway would cross both parallel runways, whereas only one runway is crossed in Alternatives A and B.

LANDSIDE ALTERNATIVES

The primary general aviation functions to be accommodated at Chino Airport include aircraft storage hangars, aircraft parking aprons, and commercial general aviation activities. The interrelationship of these functions is important to defining a long range landside layout for general aviation uses at the airport. Runway frontage should be reserved for those uses with a high level of airfield interface, or need of exposure. Other uses with lower levels of aircraft movements or little need for runway exposure can be planned in more isolated locations. The following briefly describes landside facility requirements.

Fixed Base Operator (FBO): This essentially relates to providing areas for the development of facilities associated with aviation businesses that require airfield access. This includes businesses involved with (but not limited to) aircraft rental and flight training, aircraft charters, aircraft maintenance, line service, and aircraft fueling. Businesses such as these are characterized by high levels of activity with a need for apron space for the storage and circulation of aircraft. These facilities are best placed along ample apron frontage with good visibility from the runway system for transient aircraft. The facilities commonly associated with businesses such as these include large, conventional type hangars which hold several aircraft. Utility services are needed for these type of facilities as well as automobile parking areas.

Terminal Building: General aviation terminal facilities have several functions including: providing space for passenger waiting; a pilot's lounge; flight planning; concessions; airport management; storage; and various other needs. Utility services are needed for this type of facilities as well as automobile parking areas. Terminal buildings are best placed along the apron frontage for ease of access for transient aircraft.

Aircraft Storage Hangars: The facility requirements analysis indicated the need for additional aircraft storage facilities. This could include the development of T-hangar units for small

general aviation aircraft and large clearspan hangars for accommodating several aircraft simultaneously or transient business aircraft. Executive hangar development should be considered as well. Executive hangars are smaller clearspan hangars.

Fuel Storage: All fuel storage at Chino Airport is located in underground tanks in several different areas on the airport. Access to these tanks is available only by crossing aircraft operational areas. Consideration is being given to ultimately consolidating all fuel storage in a single area on the airport as the existing underground tanks are abandoned and/or fuel storage expanded. A consolidated fuel farm allows for better monitoring of leak detection and spill prevention.

Most important to the siting of the fuel farm is fuel delivery truck access. Access should be available from the primary roadway and not require that the truck access the apron area. Airside access must also be maintained to allow for the airport fuel delivery vehicles to access the fuel storage tanks.

Helipad: A helipad is identified to provide a marked and segregated landing and takeoff area for helicopters. This is anticipated to include specific parking areas for helicopter aircraft. The former helipad was removed when Taxiway D was relocated.

Helicopter training activities are presently conducted in a paved area east of Taxiway G. This is used mostly for landing and autorotation training. This provides a segregated area on the airport for this use.

Airport Maintenance: The airport maintenance staff presently utilizes a portion of Dome Hangar #1 for the storage of airport maintenance equipment and supplies. Consideration is being given to establishing a permanent location for the development of an airport maintenance facility since Dome Hangar #1 is planned to be used for FBO activities.

Aircraft Wash Rack: Consideration is given to developing an aircraft wash/maintenance facility to provide a suitable area for the washing of aircraft. This provides for the proper disposal of aircraft cleaning fluids. There is no such facility currently available at the airport.

Segregated Vehicular Access: The present facility layout of Apron Area A and Apron Area B causes vehicular traffic to operate on aircraft taxiways and apron taxilanes. On Apron Area A, the Dome Hangars (A-230, A-335, A340, and A435), the Port-A-Port Hangars (A-445), T-hangars (A460, A465, A470, and A-475), building A-545, building A-500, and buildings A-385, A-390, A-480, A-485, A-490, A-495, A-555, and A-560 do not have segregated vehicle access. To access these facilities, vehicles cross the apron taxilanes and taxiways from Gate #4, which is located on the east side of the apron along Cal Aero Drive.

None of the facilities along Apron Area B have segregated vehicular access. Vehicles accessing facilities along Apron Area B enter at Gate #3, which is located north of the airport traffic control tower (ATCT). Similar to Apron Area A, vehicles must cross aircraft

apron taxilanes and taxiways to reach their intended destination.

Access at Gate #3 and Gate #4 is restricted to those persons which have been given an access card, or are allowed access from an airport tenant. While vehicle access is controlled at Gates #3 and #4, aircraft and vehicles share the same movement areas. This reduces safety as aircraft and vehicles could collide. The potential for runway incursions is increased as vehicles may inadvertently access active runway or taxiway areas, if they become disoriented once passing through the gate. Finally, airfield security is compromised, as there is loss of control over the vehicles as they enter the secure area. The greatest concern is for public vehicles, such as delivery vehicles and visitors, which may not fully understand the operational characteristics of aircraft and the markings in place to control vehicle access.

Chino Airport is presently implementing a program to mark vehicle access lanes on the apron areas at the airport. This will direct vehicles to specific movement areas in an effort to separate vehicular traffic and aircraft movement areas. While enhancing safety, this does not address all the security concerns as public access would still be provided within the secure AOA. The best solution is to provide dedicated vehicle access roads to each landside facility that is separated from the aircraft operational areas with security fencing. This will be examined in more detail as the landside alternatives are presented.

Security of general aviation airports is coming under greater scrutiny since the events of September 11, 2001. The *Aviation and Transportation Security Act*, passed in November 2001, created the Transportation Security Administration (TSA) to administer the security of public-use airports across the country. The TSA is in the process of establishing a general aviation security director.

In anticipation of expected rulemaking by the TSA, the American Association of Airport Executives (AAAE) created a task force to make recommendations on the future of GA airport security. The task force consisted of airport officials from general aviation facilities, as well as representatives of the National Association of State Aviation officials and the National Business Aviation Association. This task force submitted a series of recommendations to the TSA on June 3, 2002. In making their recommendations, the task force defined the most probable terrorist threat to general aviation aircraft as the possible theft or hijacking of an aircraft.

While only recommendations to the TSA, the results of the task force are the most comprehensive assessment of threats to general aviation facilities and potential security measures to date. Therefore, a brief overview of the task force recommendations applicable to Chino Airport is made to summarize current industry consensus on how to effectively secure general aviation facilities in the future.

The task force recommended the establishment of four different

categories of general aviation airports based upon the airport's location relative to potential terrorist targets, runway length, and number of based aircraft. Based upon their suggested criteria, Chino Airport would be classified as either a Category I or Category II airport. Under the recommended plan, Chino Airport would need to develop a security plan and criminal record background check would be required for all airport fixed base operators and airport tenant employees with unescorted access to the aircraft operating area.

The landside alternatives focus on four separate quadrants of the airport. Two alternatives have been developed for Apron Area A. This includes the area west of Cal Aero Drive and north of Runway 8L-26R. Two alternatives have been developed for Apron Area B. This includes all areas east of Cal Aero Drive and north of Runway 8L-26R. Finally, development opportunities in the southwest quadrant of the airport and the southeast quadrant of the airport are examined.

APRON AREA A
ALTERNATIVE A

Apron Area A, Alternative A is shown on **Exhibit 4E.** This alternative creates segregated vehicular access through the development of new roadways. At the east end of the apron, a new roadway is developed from Cal Aero Drive to serve buildings A-545 and A-550. Buildings A-480, A-485, A-490, A-495, A-555, and A-560 (located along the southern edge of the apron) are served by a new road and parking area connecting with Cal Aero Drive. This road would cross Taxiway B (future Taxiway D3). Taxiway B (future Taxiway D3) would be closed north of the road. Buildings A-385 and A-390 would be served by a new road developed from Stearman Place (A Street). This road would cross Taxiway AA. Taxiway AA would be closed north of the new road.

While providing segregated vehicular access to the facilities on the south side of the apron, the alternative would eliminate two of the three existing airside access taxiways. This would leave only a single airside access point.

This alternative would not specifically develop segregated vehicular access to the Port-a-Port hangars or hangar buildings A-460, A-465, A-470, and A-475. Unlike the hangar facilities on the south side of the apron, these facilities serve based aircraft owners and have little need for public vehicle access to the hangars (delivery vehicles, etc.). This alternative assumes that access to these hangar areas would be limited to the aircraft owners themselves. Any other person wanting to access these hangars would need to be escorted by the aircraft owner or airport administration representative. Dedicated vehicle lanes would be provided to segregate vehicular traffic and define movement areas.

A similar security arrangement would be anticipated for the Dome hangars (buildings A-230, A-335, A340, and A435). An existing public parking lot is located on the north side of the hangars. However, the office areas are located on the south side of the hangars. With the

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Merrill Ave.

Euclid Ave.

Stearman Dr. (A Street)

Cal Aero Dr.

A-305
A-310
A-315
A-320
A-503
A-505
A-510
A-520
Airport Maintenance
A-220
A-330
A-230
A-335
A-340
A-435
A-440
Planes of Fame
A-532
A-530
Planned Storage Hangars
A-245
Apron A
A-460
A-445
A-465
A-470
A-475
A-270
A-550
A-545
Aircraft Wash Rack
A-280
A-385
A-390
A-480
A-490
A-555
A-560
A-495
Fuel Storage
A-485
AA (closed)
A
B (closed)
D
E
F
D3
RUNWAY 8L-26R

LEGEND

- Airport Property Line
- Airfield Pavement
- Auto Parking/Access Roads
- Building Restriction Line
- Taxiway Object Free Area
- Planned/Proposed Building
- Pavement to be Removed/Closed
- FBO Hangar Lease Parcel
- Storage Hangar Lease Parcel
- Commercial/Industrial Lease Parcel
- Aviation-Related Commercial/ Industrial Lease Parcel
- A — Existing Taxiway Designation
- A — Future Taxiway Designation

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CHINO AIRPORT

Exhibit 4E
APRON AREA A ALTERNATIVE A

vehicular access gates located near these hangars closed, vehicles must access these facilities from the southeast portion of the apron. This alternative assumes that public access to these hangars from across the apron area would be discontinued. Public vehicles would be required to use the public parking area and access these facilities through pedestrian access gates. Airport tenants and their employees would be assumed to have access through the existing vehicular gates using marked vehicular access lanes.

This alternative proposes the development of a series of new aircraft storage hangars in the area north of buildings A-545 and A-550. The depicted facility layout includes a series of corporate hangars with vehicular parking and access on one side and airfield access on the other side. These would be developed to retain a 150-foot wide access taxilane to the Planes of Fame museum.

The Dome hangars were constructed in the early 1940s. It is anticipated that during the planning period of this master plan, these buildings may need to be replaced. Since these facilities offer substantial apron frontage, the area occupied by these hangars is best used for FBO operations, such as aircraft maintenance. Four separate hangar parcels are reserved in this area. These parcels are shown to extend to the north to the first east-west oriented roadway. The extra depth of the parcels would allow for placement of any new facilities north of the existing apron edge to provide additional apron and circulation area as needed. Buildings A-220 and A-330 would eventually be removed to allow for the greater depth in these parcels. These new hangars would be anticipated to be designed with public access from the north side of the building.

A consolidated fuel storage facility is shown for development along Stearman Place. This location offers both airside access for on-airport refueling trucks and segregated access for fuel delivery vehicles. An aircraft wash rack is shown in the area between buildings A-545 and A-550. A helipad and three parking positions are shown west of the Runway 8L holding apron.

An area for airport maintenance is reserved in the northwest quadrant of the apron, west of the FBO hangar parcels. This parcel has limited airfield access (a 75-foot taxilane); therefore, it must be used for an activity with low levels of aircraft access, such as airport support facilities such as maintenance or fuel storage.

The portions of the airport along Merrill Avenue are reserved for commercial/ industrial development. These parcels do not have the potential for airside access; therefore, these parcels can be used for alternative uses which enhance airport operating revenues.

The undeveloped area west of Stearman Place, east of Euclid Avenue is shown for aviation-related commercial/ industrial uses. As shown, a 50-foot wide taxiway could be developed from Taxiway D to serve a series of development parcels.

APRON AREA A
ALTERNATIVE B

Apron Area A, Alternative B is shown in **Exhibit 4F**. Similar to Alternative A, segregated vehicular access for buildings A-545 and A-550 is developed from Cal Aero Drive. Segregated vehicular access for buildings A-385, A-390, A-480, A-485, A-490, A-495, A-555, and A-560 would be via a roadway extending through the center portion of the apron across Taxiway A. This road would have security fencing preventing access across the road. Essentially, Apron Area A would be divided into two sections. Airfield access for the easterly portion of the apron would be via Taxiway B (future Taxiway D3). Airfield access for the westerly portion of the apron would be via Taxiway AA.

Similar to Alternative A, this alternative would not specifically develop segregated vehicular access to the Port-a-Port hangars or hangar buildings A-460, A-465, A-470, and A-475. A similar security arrangement as Alternative A is assumed to control access to and from these hangars.

Similar to Alternative A, the existing dome hangars are shown for replacement with new FBO facilities. In contrast with Alternative A, the parcels are limited to the footprint of the existing facilities. This is to allow for expansion of the existing public parking areas immediately north of the parcels. Buildings A-220 and A-330 would eventually be removed to allow for the expanded parking. A fifth FBO parcel is shown along the eastern edge of the apron. Vehicle access would be via Cal Aero Drive.

A series of corporate hangars are shown for development along Taxiway AA with vehicular access from Stearman Place. A parcel of land at the terminus of Stearman Place is reserved for airport maintenance. In contrast with Alternative A, this parcel of land is located closer to the AOA and any future perimeter service road that may be developed.

This alternative places the consolidated fuel storage facility west of the FBO parcels with access from Stearman Place for fuel delivery vehicles. An aircraft wash rack is reserved for the area north of building A-460.

Similar to Alternative A, a series of commercial/industrial parcels are reserved along Merrill Avenue. In contrast with Alternative A, the undeveloped area west of Stearman Place, east of Euclid Avenue, is also reserved for commercial/industrial development.

APRON AREA A
ALTERNATIVE C

Apron Area A, Alternative C is shown on **Exhibit 4G**. Similar to Alternatives A and B, segregated vehicular access for Buildings A-560 to A-485 is developed from Cal Aero Drive. In this alternative, Buildings A-385 and A-390 are relocated to the west. This allows for additional aircraft parking apron to be developed between Taxiways AA and A. Furthermore, in contrast with Alternatives A and B, this allows for retaining dual taxiway access to Apron Area A. Vehicular access for relocated

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Merrill Ave.

A-305
A-315
A-310
A-320
A-503
A-505
A-510
A-220
A-330
A-520
Planes of Fame
A-230
A-335
A-340
A-435
A-440
Fuel Storage
A-532
A-530
Airfield Access
Planned Storage Hangars
Aircraft Wash Rack
Cal Aero Dr.
A-245
A-460
A-465
A-445
A-470
A-475
Euclid Ave.
Stearman Dr. (A Street)
Public Access
Public Access
A-545
A-550
A-270
A-280
Airfield Access
Airfield Access
A-480
A-490
A-555
A-560
A-495
A-385
A-390
A-485
Airport Maintenance
AA
A (closed)
D3 B
D
E
F
D3
RUNWAY 8L-26R

LEGEND

- Airport Property Line
- Airfield Pavement
- Auto Parking/Access Roads
- Building Restriction Line
- Planned/Proposed Building
- Pavement to be Removed/Closed
- FBO Hangar Lease Parcel
- Storage Hangar Lease Parcel
- Commercial/Industrial Lease Parcel
- A — Existing Taxiway Designation
- A — Future Taxiway Designation

NORTH

0 300 600
SCALE IN FEET

CHINO AIRPORT

Exhibit 4F
APRON AREA A ALTERNATIVE B

00MP16-4G-11/11/03

Merrill Avenue

Euclid Avenue

Stearman Place

Cal Aero Drive

A-305
A-310
A-315
A-320
A-503
A-505
A-510
A-220
A-330
A-230
A-335
A-340
A-435
A-520
Planes of Fame
A-440
A-532
A-530
AIRCRAFT STORAGE HANGAR (A-240)
A-245
AIRCRAFT WASH RACK
Apron Area A
A-445
A-460
A-465
A-470
A-475
A-270
A-545
A-550
RELOCATED BUILDINGS
A-385 AND A-390
BUILDINGS TO
BE REMOVED
A-280
A-385
A-390
A-480
A-490
A-495
A-555
A-560
A-485
AA
A
Perimeter Service Road
B
HELIPAD
H
D
E
F
D3
REIL
Runway 8L-26R (Existing 4,838' x 150' Ultimate 5,500' x 150')

LEGEND

- Airport Property Line
- Object Free Area (OFA)
- Runway Safety Area (RSA)
- Obstacle Free Zone (OFZ)
- Building Restriction Line (BRL)
- Localizer Critical Area
- Glideslope Critical Area
- Runway Visibility Zone
- Runway Protection Zone (RPZ)
- Ultimate Airfield Pavement\
- Ultimate Roads/Parking
- Pavement/Buildings to be Removed
- Aircraft Parking Limit
- Lease Parcel
- Commercial/General Aviation (FBO)
- Airport Maintenance/Administration
- Aviation-Related Commercial/Industrial
- A — Existing Taxiway Designations
- A — Future Taxiway Designations

NORTH

0 300 600

SCALE IN FEET

CHINO AIRPORT

Exhibit 4G
APRON AREA A - ALTERNATIVE C

00MP16-4H-11/11/03

Executive Hangar
Fuel Storage
Executive Hangar
Aircraft Wash Rack
Merrill Avenue
B-310 Chino Fuel Services
T-Hangars
B-120
B-130
B-140
B-150
B-160
B-170
B-180
B-220
B-230
B-240
B-250
B-260
B-270
B-280
B-290
B-320
B-330
B-340
B-350
Taxi
Cal Aero Drive
Hangar
B-297
Executive Hangar
Public Access
ATCT
B-195
B-197
Apron Expansion
J G1
N
G H
F G2
C
400'
500'
12
N
M
H
G H
D
D
RUNWAY 3-21
RUNWAY 8L-26R
25

LEGEND

- Airport Property Line
- Airfield Pavement
- Auto Parking/Access Roads
- Building Restriction Line
- Aircraft Parking Limit
- Planned/Proposed Building
- Pavement to be Removed/Closed
- General Aviation Terminal Parcel
- Storage Hangar Lease Parcel
- Commercial/Industrial Lease Parcel
- A — Existing Taxiway Designation
- A — Future Taxiway Designation

NORTH

0 300 600
SCALE IN FEET

CHINO AIRPORT

Exhibit 4H
APRON AREA B ALTERNATIVE A

Buildings A-385 and A-390 would be developed from Stearman Place.

This alternative locates a large FBO parcel along Cal Aero Drive. FBO parcels are retained in the area currently occupied by the Dome Hangars. Airport maintenance is reserved at the end of Stearman Place. Aviation-related commercial/industrial parcels are located along Euclid Avenue and Merrill Avenue.

APRON AREA B
ALTERNATIVE A

Apron Area B, Alternative A is shown on **Exhibit 4H**. The primary facility requiring public access in this area is building B-350. Alternative A proposes to develop segregated vehicle access to this facility via a new roadway extending east from Gate #4. This roadway would extend across Taxiway F (future Taxiway C2). Taxiway F would be closed north of the new road. This road would be fenced along both sides. This would eliminate airfield access across the apron area. As shown on the exhibit, all aircraft would need to taxi north and access the airfield via the hangar taxilanes between buildings B-320, B-330, B-340, and B-350. Vehicular access to the remaining facilities would be limited to the aircraft owners and airport tenants. Other users would require escorted access.

This alternative proposes the development of a general aviation terminal building west of the ATCT. Executive hangar parcels are reserved along the northern side of the ATCT road. An aircraft wash rack, consolidated fuel farm, and a series of executive hangars and T-hangars are shown along Merrill Avenue. This alternative provides for apron expansion between Taxiways F (future Taxiway C2) and G (future Taxiway H).

A helipad is shown to replace the existing helicopter training pad located east of Taxiway G (future Taxiway H). While segregated from the fixed-wing operational areas, this location does not offer access to transient general aviation services such as fueling and maintenance. This location also does not provide vehicular access to transfer passengers and payload.

The area northeast of Taxiway G (future Taxiway H) is reserved for commercial/industrial development. The area immediately east of the airport property line is owned by San Bernardino County. Should the County develop that parcel of land for commercial/industrial uses, this area of the airport could benefit from developing similar uses.

APRON AREA B
ALTERNATIVE B

Apron Area B, Alternative B is shown on **Exhibit 4J**. This alternative develops segregated vehicular access to building B-350 via a roadway extending south from Merrill Avenue. This roadway would extend along an existing T-hangar access taxilane, which would be closed. This roadway would be fenced, preventing aircraft from taxiing to the east across the roadway. Vehicular access to the remaining facilities would be limited to the aircraft

owners and tenants. Other users would require escorted access.

Similar to Alternative A, a series of executive hangars are shown for development along the roadway north of the ATCT. A helipad is reserved for the area west of the ATCT. Executive hangars and the consolidated fuel farm are reserved along Merrill Avenue. The apron is expanded from Taxiway F (future Taxiway H) to Taxiway J (future Taxiway C1).

The area northeast of Taxiway G (future Taxiway H) is reserved for aviation-related commercial development. As shown on the exhibit, taxiway access could be developed from Taxiway M and Taxiway D. This area is best used for aviation-related uses with low levels of airfield access since direct access is not available from the runways. Transient uses would be limited in this area as direction-finding may be difficult for people not familiar with the layout.

SOUTH LANDSIDE ALTERNATIVES

As evidenced in the Apron Area A and Apron Area B alternative discussions above, there are only a few developable parcels left in those areas. The only apron frontage available in Apron Area A is through the redevelopment of the dome hangar areas or the undeveloped apron area north of buildings A-545 and A-550. Redevelopment of the dome hangars would most likely occur in the intermediate or long term planning horizons as the existing dome hangars are currently in use. The developable parcels in Apron Area B are limited mostly to aircraft storage hangars as there is no apron frontage available for FBO development.

Considering these limitations, the area south of Runway 8L-26R, provides the best opportunity to serve intermediate and long range general aviation demand. The area south of Taxiway N (future Taxiway A) provides ample runway frontage for activities with high levels of airfield access.

Southwest Landside Development

A potential development scenario for the area south of Taxiway N (future Taxiway A) is shown on **Exhibit 4K**. This alternative locates a large apron area east of Runway 3-21, south of Taxiway N (future Taxiway A), to support FBO development. An apron area is best developed in this area, as this area is located approximately along the midpoint of Runway 8R-26L.

This apron area would be served by a segregated helipad and fuel storage. A joint-use regional structural firefighting and airport rescue and firefighting facility is shown for development along Kimball Avenue. Airfield access would be via Taxiway M.

The area west of Taxiway C is shown for the development of aircraft storage hangars. This facility layout provides for segregated vehicular and aircraft access through the development of a series of hangars with airfield access on one side and roadway access on the other side. These parcels would be served by dual access taxilanes, which would limit the potential for congestion at the airfield access point.

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Executive Hangar Parcels
B-120
B-130
B-140
B-150
B-160
B-170
B-180
Executive Hangar Parcels
Cal Aero Drive
Taxi
B-220
B-230
B-240
B-250
B-260
B-270
B-280
B-290
Taxiway Closed - Public Access
Hangar
B-297
Aircraft Wash Rack
Controlled Access
E
ATCT
B-195
B-197
Taxi
B-320
B-330
B-340
B-350
Executive Hangar Parcels
Merrill Avenue
Fuel Storage
B-310
Chino Fuel Services
J
G1
Apron Expansion
N
G
H
H
Apron Expansion
C
F
C2
RUNWAY 3-21
400'
750'
400'
750'
500'
M
N
H
G
D
D
26 R
12
25 L
NORTH
0
300
600
SCALE IN FEET

LEGEND

- Airport Property Line
- Airfield Pavement
- Auto Parking/Access Roads
- Building Restriction Line
- Aircraft Parking Limit
- Planned/Proposed Building
- Pavement to be Removed/Closed
- FBO Hangar Lease Parcel
- Storage Hangar Lease Parcel
- Commercial/Industrial Lease Parcel
- Aviation-Related Commercial/ Industrial Lease Parcel
- A — Existing Taxiway Designation
- A — Future Taxiway Designation

CHINO AIRPORT

Exhibit 4J
APRON AREA B ALTERNATIVE B

00MP16-4K-11/14/03

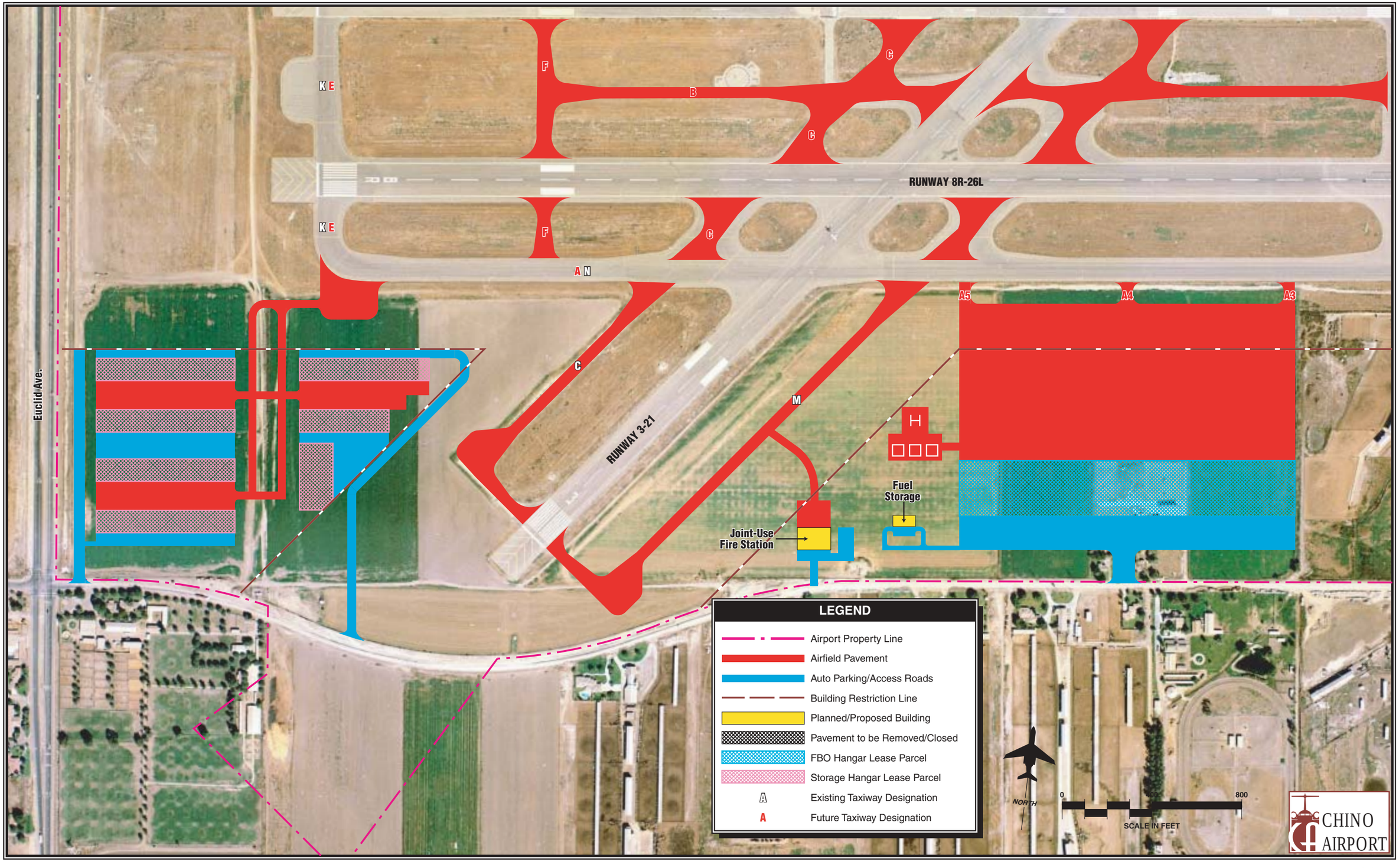

Exhibit 4K
SOUTHWEST LANDSIDE DEVELOPMENT

Southeast Landside Development

Potential southeast landside development is shown on **Exhibit 4L**. As shown on the exhibit, a large apron area and four large conventional hangars are located in this area. This alternative anticipates similar uses in this area in the future. The expansion of the apron area to the west and development of aviation-related commercial/industrial parcels is shown along Grove Avenue. The apron is best expanded to the west as shown, as the area east of the existing hangars is used for vehicular access and parking.

The area east of the existing hangars is shown for the development of aviation-related commercial/industrial parcels. Since this area does not have any runway frontage, land uses with lower levels of airfield access should be directed towards this area.

SUMMARY

The process utilized in assessing the airside and landside development alternatives involved a detailed analysis of short and long-term requirements as well as future growth potential. Current airport design standards were considered at each stage of development.

Upon review of this report by San Bernardino County and the PAC, a final master plan concept can be formed. The resultant plan will represent an airside facility that fulfills safety and design standards and a landside complex that can be developed as demand dictates.

The proposed development plan for the airport must represent a means by which the airport can grow in a balanced manner, both on the airside as well as the landside, to accommodate forecast demand. In addition, it must provide (as all good development plans should) for flexibility in the plan to meet activity growth beyond the 20-year planning period. The remaining chapters will be dedicated to refining the basic concept into a final plan with recommendations to ensure proper implementation and timing for a demand-based program.

00MP16-4L-11/14/03

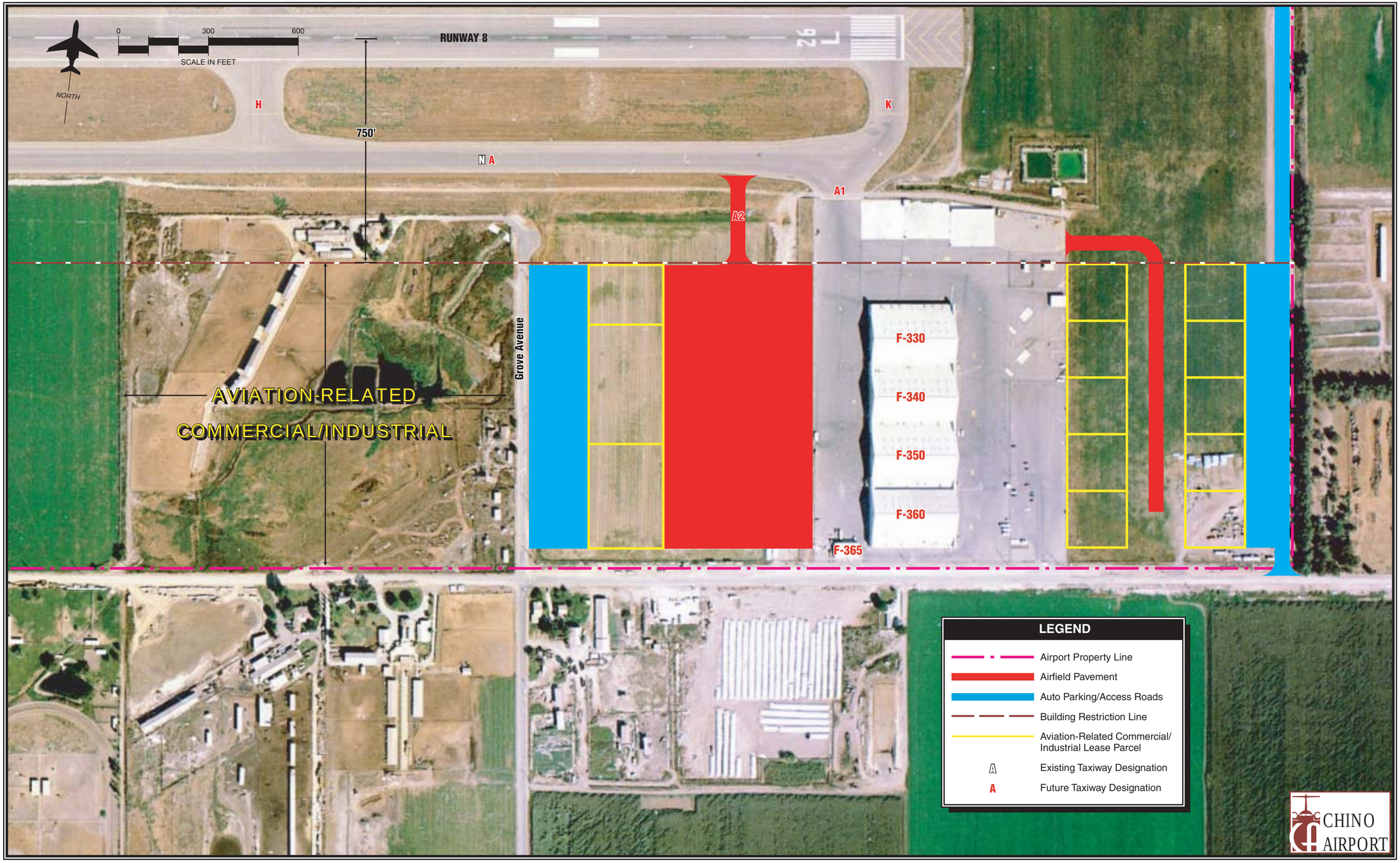

Exhibit 4L
SOUTHEAST LANDSIDE DEVELOPMENT